Research information in nurses' clinical decision-making: what is useful?

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Aim. To examine those sources of information which nurses find useful for reducing the uncertainty associated with their clinical decisions.

Background. Nursing research has concentrated almost exclusively on the concept of research implementation. Few, if any, papers examine the use of research knowledge in the context of clinical decision-making. There is a need to establish how useful nurses perceive information sources are, for reducing the uncertainties they face when making clinical decisions.

Design. Cross-case analysis involving qualitative interviews, observation, documentary audit and Q methodological modelling of shared subjectivities amongst nurses. The case sites were three large acute hospitals in the north of England, United Kingdom. One hundred and eight nurses were interviewed, 61 of whom were also observed for a total of 180 hours and 122 nurses were involved in the Q modelling exercise.

Results. Text-based and electronic sources of research-based information yielded only small amounts of utility for practising clinicians. Despite isolating four significantly different perspectives on what sources were useful for clinical decision-making, it was human sources of information for practice that were overwhelmingly perceived as the most useful in reducing the clinical uncertainties of nurse decision-makers.

Conclusions. It is not research knowledge *per se* that carries little weight in the clinical decisions of nurses, but rather the medium through which it is delivered.

Specifically, text-based and electronic resources are not viewed as useful by nurses engaged in making decisions in real time, in real practice, but those individuals who represent a trusted and clinically credible source are. More research needs to be carried out on the qualities of people regarded as clinically important information agents (specifically, those in clinical nurse specialist and associated roles) whose messages for practice appear so useful for clinicians.

Keywords: evidence-based nursing, research information, research utilization, Q methodology, mixed methods research design

Introduction

The primary criteria (sic.) of the success of a clinical information system is that it is used. (Royle *et al.* 2000, p. 108)

It is increasingly expected that health professionals will inform their clinical decisions with appropriate evidence from research. In the United Kingdom (UK) a series of policy initiatives over the last 12 years have led to the evolution of an evidence-based culture of health service delivery (Department of Health 1989, 1993a, 1993b, 1994, 1995, 1996, 1997, Secretary of State for Health 2000).

Covell *et al.* (1985) discussed the decisions that doctors face in practice, to the kinds of clinical questions generated, and the resultant information needs. Covell and colleagues' approach heavily influenced the development of our project in that perhaps for the first time, they related information-use to the forms of decisions professionals faced in practice. They found that clinicians generated a range of clinical questions from practice: questions of 'fact' (40%), medical opinion on management (43%) and non-medical information (17%). They also recognized that professionals could not be relied upon accurately to self-report their information use and that printed information sources were of limited use in practice (Covell *et al.* 1985).

As in Covell *et al.*'s approach we wished to explore the relationship between decision-making and information-use. We also adopted some of the desirable characteristics of their methodology (specifically, the use of observation in conjunction with other forms of data collection).

Most of the existing research on nurse decision-making is of poor quality. Many studies use survey methods, often with the self-report questionnaire as a tool for data gathering (Robichaud-Ekstrand & Sherrard 1994, Funk *et al.* 1995, Shaffer 1996, Parahoo 2000, Rodgers 2000). Studies of decision-making in medicine that have combined observation with self-report tools highlight the over-reporting that occurs with this type of approach to research design (Covell *et al.* 1985). More recently, Estabrooks (1999) has highlighted the lack of theoretical clarity associated with the concept of research utilization itself. This work implies that different studies of the use of research evidence by nurses may not even be reporting the same phenomenon.

Other studies examining research utilization via the survey method are limited in their generalizability because of the small non-random nature of their samples (Thompson & Sutton 1985). Others, despite reasonably large randomly selected samples, have poor response rates. For example, Bostrum and Suter's (1993) examination of the correlates of research utilization only secured a response from 23% of the original 7000 nurse sample. Some studies manage to combine all three of these characteristics. For example, Champion and Leach (1989), in their investigation of variables associated with research utilization, used a battery of self-report scales with a convenience sample of 150 nurses, of whom only 59 yielded data (a response rate of just 39%).

Studies using qualitative methodologies fair little better in terms of quality. For example, few qualitative studies describe an explicit framework for sampling informants and settings (Rodgers 1994, Luker & Kenrick 1995, Meah *et al.* 1996).

There is much repetition in the literature and a paucity of good quality empirical studies examining information use in clinical decision-making by nurses. Nevertheless, a typology of four groups of variables which may impact on nursing's relationship with research evidence can be advanced. This typology formed the basis for the theoretical sampling procedures for the study reported here and has been explored more fully elsewhere (Thompson 1999):

- Professional–cultural variables such as cultural resistance to certain forms of research (such as randomized controlled or 'quantitative' designs.
- Environmental variables such as the impact of clinical specialities on the ways in which information is used.
- Individual decision-maker related variables such as the impact of clinical experience, mode of professional preparation or depth of professional knowledge.
- Information-related variables such as the prominence of statistics, mode of presentation, or its quality.

In order to ascertain the information that nurses need we must examine the decisions that they face and try to establish those areas where uncertainty is a feature of decision-making, and to which research knowledge can make a unique contribution. There is a need, however, to step back from the issue of research utilization *per se* – a concept which has been exposed as poorly defined (Estabrooks 1999) – and that is the purpose of this paper. We sought to examine the real life clinical decisions that nurses face, and the information which they consider most useful in helping shape their responses to these decision challenges. Our goal is to inform the effective dissemination of research to increase its potential for influencing the decisions of clinicians.

The study

Methods

The methods employed in this project have been reported more fully elsewhere (Thompson *et al.* 2001). Briefly, a qualitative naturalistic design was used in order to provide a rich description offering insights into the real clinical world which nurses inhabit.

A case study design approach was used involving three large acute hospitals, sequentially sampled with embedded units of analysis – the case, the wards and the individuals (Yin 1994). Table 1 presents the key features of each of the three sites. Data collection was in two phases:

- qualitative data collection involving interviews, observation and documentary analysis. The basis for interviews and observation was a theoretical sampling frame derived from the relevant research literature (Thompson 1999);
- Q methodological modelling of the shared subjectivities of nurses.

Data collection and analysis were piloted in two unconnected large acute hospitals in the UK. Ethical approval was granted from the relevant Local Research Ethics Committees.

Within each of the sites, three acute medical wards, three general acute surgical wards and three coronary care units (CCUs) provided the settings for data collection. Further details of the wards and units can be found in Thompson *et al.* (2001).

Q methodological modelling

A Q sample was designed to allow nurses to model their views on the usefulness of information sources for clinical decision-making. Usefulness was defined as the ability of the source to help answer the clinical question arising as a result of the clinical decision reflected on. The clinical decisions have been reported elsewhere (Thompson *et al.* 2001). Statements were printed on to cards representing sources of information, and individuals sorted these according to a 'condition of instruction' (Table 2). Sorting was into a normal distribution with an x axis arranged along a continuum ranging from +5 most useful through to –5 least useful. Analysis of the Q sorts was according to the usual tenets of Q methodological modelling (McKeowan & Thomas 1988). Because of the large number of Q sorts involved we used a system of data spiking. This involved randomly selecting a sample of the original sorts, running the Q analysis once, which resulted in the creation of reference sorts, inserting these sorts into the data matrix, and then running the Q analysis again. The correlation matrix used as the basis for the factor analysis then yielded correlation coefficients for individuals against the reference sorts (isolated perspectives). These coefficients were then used as dependent variables in a series of regression models. For more details on Q methodology readers are directed to McKeowan and Thomas (1988).

Regression analysis allowed exploration of factor associations with key demographic variables in the nurses: age, level of education, clinical experience. The final analysis was derived from the Q sorts of 122 nurses. After checking that the assumptions needed for ordering least squares regression were met, independent variables were entered separately into a multivariate model in order to assess independent effects.

In this paper, then, the structure and form of the analysis is derived from the Q sorts, but the interview and observational material adds depth to the reporting, and qualitative material from individuals loading significantly on a factor helps in the interpretation of perspectives.

Results

We identified four perspectives on the perceived usefulness of research information sources, which accounted for 55% of the variance associated with the Q sorts. Useful information offered:

- direction, guidance or prescription;
- a form of experiential knowledge;
- centrally supported experience-based messages for practice;
- a blending of research technologies and experience.

The factor scores associated with these four perspectives are presented in the factor array in Table 3.

Perspective 1: direction, guidance or prescription

This perspective accounted for 16% of the variance in the Q sorts and was marked by the usefulness associated with the prescriptive technologies of guidelines and protocols.

Table 1 Case site characteristics

Case site features	Case site 1	Case site 2	Case site 3
General information	Large hospital (700 beds). Referral centre for some specialities; large postgraduate medical education centre	University teaching hospital (800 beds). Recent merger had led to formation of a new Trust body	Medium sized District General Hospital (650 beds) offering general medical and surgical services, Accident and Emergency and outpatient departments.
Research and development infrastructure	Member of NHS Research and Development (R&D) Consortium. Facilitator in post to co-ordinate Nursing and Midwifery R&D within the context of a published strategy for developing research in practice. Key groups: the Research Active Group; the Midwifery R&D Group; the Nursing Research Quality Group	Established R&D panel to develop a strategic framework of research, subject to annual review. Nurses represented on both the Board of Directors and the R&D panel. Nurses actively involved in clinical audit. Research into Practice group had been established to implement the findings of nursing research	R&D Directorate: Health Services Research Unit and the Clinical Audit Department. Nursing and professions allied to medicine (PAM) involvement in R&D included a Research Support Group and clinical audit co-ordinator posts
NHS R&D support funding	£617 000 – 3 years. Funding directed towards medical R&D. Nursing research mainly in primary and community care and women and children's health	£6 million for 1997/98. Additional funds derived from charities (in excess of £1 million) and commercially funded work (£1·5 million)	£30 000 per annum for 3 years (1998–2001). Revenue from commercial research amounted to £250 000 per year
Nurses' role in any R&D committees	Nursing representation on Trust R&D Committee, R&D Division and Consortium Quality Group	The Local Research Ethics Committee (LREC), Clinical Effectiveness Group University and to be included in proposed Consortium Steering Group for R&D funding	LREC and R&D Steering Group
Practice development structures	Over 30 clinical nurse specialists (CNSs) and nurse practitioners in post and a team of 12 practice development nurses (PDNs). Active link nurses	Large body of CNSs active in practice development, alongside a smaller number of PDNs. Link nurse structure in place	Small team of PDNs focusing on increasing nurses' clinical skills. CNSs attached to various specialities. Link nurse system in place but not effective
Library provision	Extensive postgraduate medical library (£18 000 books, 286 journal titles) and good on-line data base provision and CD-ROM system	Well-stocked postgraduate medical library offering good on-line database provision. Also a smaller library catering to nurses, midwives and PAMs, with a good range of textbooks and journals but limited on-line database provision	Access to well stocked but physically cramped library (20 000 textbooks, 400 periodicals). On-line access to MEDLINE, CINAHL, COCHRANE Library and the National Research Register
Ward-based information technology	Ward-based computers used for patient administration; not linked to electronic databases	Ward-based computers for patient administration; coronary care unit (CCU) installing computer linked to electronic databases just as fieldwork ended	Ward-based computers used for patient administration; not linked to electronic databases
Links with local universities	Strong links with local university offering both undergraduate and postgraduate nurse training through a Faculty of Health, comprising Schools of Nursing, community and Health Studies and Medicine	Strong links between the Trust and the 'old' and 'new' university providers of medical and nursing education. Some nurses working in the Trust also held part-time academic posts as senior lecturers	Strong links had been established and academics were involved in Trust R&D activity. The university offered diploma level training for student nurses, continuing professional development(CPD) and Masters level courses and was beginning to recruit doctoral students

Table 2 The condition of instruction

Think of a clinical question based around a decision you have made or that might arise in your clinical practice. Some examples include:

Choosing a time to start cardiac rehab:

'in patients following acute myocardial infarction what is the best time to start cardiac rehab in order to promote improvements in their outcomes?'

Deciding the best method of monitoring routine blood sugars in a young man, with moderate learning difficulties and who is a newly diagnosed diabetic:

'in patients with moderate learning difficulties and who have been newly diagnosed as diabetic which method of obtaining blood sugar levels is likely to be the most accurate and encourage regular monitoring?'

Deciding what sort of dressing to use for leg ulcers:

'in patients with exudating, open, venous leg ulcers, which is better for promoting rapid healing – sorbosan and dry dressings or charcoal-based dressings?'

A middle aged male patient with an acute MI and no history of stroke asks you the risks of a stroke before you start thrombolysis. You decide that the risks should be explained. The question is,

'what proportion of middle aged male patients undergoing thrombolysis for acute MI will experience a CVA?'

Now write the decision and the question down.

The decision I considered was

.....

The question I formulated was

.....

Now look at the different sources of information in pack C. Sort them according to those you feel would be *most useful* in helping answer your question (+5) *in practice* through to those you feel would be *least useful* (−5)

Prescriptive or guiding technologies

Aside from the role of clinical nurse specialists (CNSs) (to which we will return presently) it can be seen from Table 3 that this first perspective was characterized by the reported relative usefulness of technologies such as local and national clinical guidelines and locally produced standards.

These guiding technologies often represented the 'medical' component of procedures, whilst the nursing element was often absent. The process of developing protocols and guidelines was seen as an effective mechanism for breaking down barriers between doctors and nurses. This was a particular feature of CCUs, perhaps reflecting the fact that generally they tended to have more multidisciplinary protocols in place and a more defined set of procedures:

> Nurse: It's very helpful in as much as if perhaps somebody comes to prescribe a medication for a condition that they'd never dealt with before and is perhaps not so open to discussion – as some people aren't. Particularly people who are perhaps threatened by the environment, it makes life much easier to say – well what we suggest here is this and it's certainly smoothed the waters. It improves relationships between the nursing staff and the medical staff. All of the junior medical staff get a copy of this. All of the staff on the unit get a copy of this. All the consultants get a copy of this and the consultants…at each draft it's sent round to the consultants for them to look at and I get a draft of it, and we discuss that before it goes into the unit. (Ward Manager, CCU, Site 3)

Guidelines and protocols derived some of their utility by virtue of their status as the products of clinical experts:

> Nurse: …yeah, it seems to be effective, yeah.
>
> Int.: When you get information from them, do you trust that information?
>
> Nurse: Yeah…
>
> Int.: Why, what's the basis…?
>
> Nurse: Because they're specialist nurses. That's why…they have a good grasp of knowledge. (Staff Nurse, D, Surgery, Site 2)

We observed that the most useful guidelines or protocols were those sponsored or initiated by doctors (as part of a multidisciplinary endeavour). For example, the management of diabetes or administration of chemotherapy in general medical wards. The nurses involved had no problem with this – in fact they respected the doctors' contribution. Some nurses perceived that documents which had been developed in conjunction with medical staff merited a higher weighting in their decision-making processes:

> Int.: Right, they find them invaluable…
>
> Nurse: Yes, they do because it empowers them really to make comment. Because they know that this is the way that suggests to us from the research and the most recent findings, and as collected by Dr X, that this is perhaps what we should be doing in this

Table 3 Usefulness Q sample

No.	Statement	Factors 1	2	3	4
1.	A systematic summary of all research studies written by a colleague or someone in the Trust	2	0	1	2
2.	A single research study carried out by someone in the Trust (unpublished)	−4	−1	0	0
3.	A case study written by a nurse in the nursing times	−2	0	2	−2
4.	A case study written by a nurse in the *Journal of Advanced Nursing*	−1	0	2	0
5.	An information file kept on the ward	2	1	2	−2
6.	Information from a teaching session organized by one of your colleagues	0	2	0	0
7.	Your experience of previous patients	1	4	3	4
8.	A single research study published in the *British Medical Journal* (*BMJ*) or the *Lancet*	−1	−1	−4	0
9.	Patient information leaflet produced by the Trust	0	1	−1	−3
10.	Patient information leaflet produced by national/international organization	5	5	5	5
11.	The clinical nurse specialist in this area	0	−4	−1	−4
12.	A product company telephone advice line	0	−4	−1	−4
13.	Colleagues verbal feedback of a study he/she has read	−3	0	1	−3
14.	General group discussion with nursing colleagues	2	2	1	0
15.	Research project carried out by a colleague for their masters degree or another form of higher degree	0	0	0	2
16.	Article seen in the newspaper or on television	−5	−3	−3	−3
17.	Trust clinical audit/clinical effectiveness/clinical governance department	0	0	2	1
18.	Ward manager/Sister	1	3	3	0
19.	A member of the practice development team	1	1	3	1
20.	Medical/nursing library (trust-based)	0	−1	0	3
21.	Trust Research and Development (R&D) department	−1	−1	1	2
22.	Product company representative or literature	−1	−1	1	−2
23.	MEDLINE/CINAHL on CD-ROM	1	−3	−1	3
24.	The internet (world wide web)	0	−4	−4	1
25.	BBC/RCN open learning zone	0	−2	−2	−2
26.	A single research study published in professional nurse or the nursing times	−2	0	−1	−1
27.	Locally produced standards	3	1	0	0
28.	The patient or their family	−1	4	−2	−1
29.	Local clinical guidelines or protocols	4	3	4	−1
30.	National clinical guidelines	4	1	0	1
31.	A single research study published in the *Journal of Advanced Nursing*	−3	−2	−1	0
32.	A systematic summary of all research studies published in *Journal of Advanced Nursing*	2	−2	−1	4
33.	Doctor's report of a research report he/she has read	−2	−1	0	−1
34.	Text book published in the last 10 years	−1	−3	−2	−4
35.	Text book published before 1989	−4	−5	−5	−5
36.	The link nurse with responsibility for that area	3	3	4	3
37.	Journal club	−3	−2	−3	0
38.	General group discussion with multidisciplinary team	3	2	0	2
39.	Local audit study	1	0	0	1
40.	Research project carried out by a colleague for an ENB course	0	2	1	1
41.	Conference paper or notes	−2	0	−2	1

ENB = English National Board of Nursing, Midwifery and Health Visiting.

situation. And it gives them…I think it makes them feel more credible that, that they're able to contribute really. (Ward Manager, CCU, Site 3)

Technologies to a point: the role of experience

The other useful sources of information according to the nurses who defined this perspective were the CNSs and the (related) link nurse role (Table 3, statements 11 and 36). Nurses trusted the advice of the specialist. This Trust was linked to the extensive clinical experience of most specialists. This expertise was a crucial ingredient in developing useful local protocols but it was also valued as a stand alone resource to be tapped into when one's own knowledge fell short:

Int.: What kind of advice do you need about dressings? Why do you have to call her in – you have been on here 10 years?

Nurse: You know there is that many products, it is hard knowing which ones to use. You get so many – our cupboard is full of dressings but it is finding which is the best for which wound really and sometimes you just think – you are bombarded with all these things – you sometimes need somebody to say, well, this works or you know, we have tried it on so and so and it works, so it is good really from that point of view. (Staff Nurse, E, Surgery, Site 3)

However, it was clear that for some nurses, usefulness in the CNS role was a result of the fact that they could avoid responsibility for decision-making, and refer to another nurse rather than make the decision themselves. Referral was the end point for many decisions, and some nurses recognized that a degree of de-skilling was inevitable:

Nurse: Well, people would say it was a de-skilling thing, having these specialist Sisters. However, we're jack of all trades, master of none and you don't always have time to give that specialist care to that patient. You see that patient as a whole, if they've had a formation of colostomy, it's very difficult to have your mind full of every single piece of knowledge. That is what they do, I suppose in reverse you could say is that all they do, do they then forget about the patient as a whole? You know, I can't really answer that. (Staff Nurse, E, Surgery, Site 3)

It was the idea of clinical credibility that made the strategy of referral possible; clinical credibility along these lines becomes a necessary condition for making a source useful. The importance of credibility was reinforced by the rejection of the mainstream media presentation of health care research as useful (no. 16). Research information was also used to validate decisions already taken:

I think you need to be able to back up what you're doing…you can't go spouting off to people about something just through a gut feeling. It's a way of just proving sometimes, you can make it work to your advantage. (Sister, Medicine, Site 3)

It was interesting that nurses defining this perspective did not see textbooks (which were a major information resource) on wards as useful. Interviews revealed that many nurses saw textbooks as teaching aids for junior colleagues, new starters or students, rather than resources to be accessed as a vehicle for real time clinical problem solving.

Practitioners aligned with this perspective also distinguished between primary research generated by nurses within their Trusts (statement 2) and more 'applied' research products (no. 29/30) – which people saw as useful. Some nurses had an intuitive awareness of the small-scale nature and limited generalizability of much local primary research:

Nurse: Well, I think…it was a woman who had done an ENB course, she'd done the 998, and she was looking into non-reporting of cardiac pain. But I think it was a very small study. She'd not used proven research tools, and the way she asked the patients, I think she got the answers that she wanted, rather than…You know. (Staff Nurse, CCU, Site 1)

Associated characteristics

Regression modelling of this perspective showed none of the demographic variables as predictors of this factor. This suggests that nurses from all backgrounds were equally likely to align themselves with this perspective.

Perspective 2: usefulness as experiential knowledge

Experience as currency

For nurses defining this perspective it is clinical experience – either one's own or that of others (including patients) – that is afforded the highest weighting in clinical decision-making (Table 3, statements 11, 28, 7, 18, 36).

For the nurses aligned with this perspective, colleagues (including doctors) represented their core information resource for clinical decisions. The overwhelming usefulness of the CNS role and experienced colleagues was primarily attributable to a number of characteristics:

- they were close at hand;
- their advice was tailored to the individual problem at hand;
- they were seen as credible;
- their advice was trusted.

Often advice came in the form of obvious and simple clinical tips for practitioners:

Nurse: Well, I tell you what I did, we went to a study day and a very simple tip she suggested was, you know, the 'Comfeel' dressings which you're supposed to leave on for er…3–5 days, it's so obvious really. She said if you write the date on the dressing when you actually apply it and then subsequently people know how long it's been on. Now it's so obvious and that is something that we have sort of disseminated round now and most of us do that. (Staff Nurse, Medicine, Site 3)

However, there was little appraisal of the knowledge imparted by experience-rich sources. Yet it was clear from talking to CNSs that their knowledge often came from the same sources (such as commercial product literature) seen as problematic by nurses (this is highlighted again later in the paper):

Nurse: If there's information about new products, well we would have had it first from the company reps. who regularly come to see us to give us information on their new products, and we help trial them out, help them with their research for it, and then we would pass that

on to the link nurses. But we wouldn't necessarily wait for a meeting to pass it on to the link nurses, we'd just come and just say, if we were using it, we would tell them we were using this and why we were using it and what the advantages of it were. (Clinical Nurse Specialist, Surgery, Site 2)

The ability of experience to override research-based technologies in place was pervasive. Experience provided the ultimate fallback mechanism for most nurses, and ultimately was the currency that had most value in the clinical arena:

Nurse: There may well be a protocol somewhere, you know. Certainly at one stage I think we did have a proper protocol for diabetic and necrotic ulcers.

Int.: Right.

Nurse: But I think in the end we found that we followed the protocol and then the consultants came along and wanted something else. So over a period of time it just got sort of discounted really and we just carried on. Not doing our own thing, but…you know, all of us using our experience and drawing on each others' experience. I mean, an example on Saturday, there was another E Grade who's actually been on here – she's about my age – and she's been on here all this time, you know. And she asked me to go and see an ulcer on a large hernia to see what I thought I would put on it. She knew what she thought and she wanted to see if we, you know, if we agreed, sort of thing. So, I mean I think we use each other as a sounding board as well to see what we feel. (Staff Nurse, E, Medicine, Site 3)

Nurses defining this perspective tended towards seeing experience as the *core* basis for decision-making and also the primary means of improving the decision-making process. The combination of experience and a perceived research awareness made the specialist function credible and change possible. However, changing colleagues' practice remained difficult; yet, paradoxically, it was often the least powerful and experienced member of a ward team (the most junior link nurse) who was charged with the task of facilitating 'evidence-based' change:

Nurse: [at hospital X] they're quite open to ideas, whereas I found up here, to make change happen, it takes ages. I mean, I developed a new wound assessment tool, which took me a couple of months, because the documentation here was poor, and I'm tissue viability link nurse on the ward anyway so we developed this assessment tool. The ward didn't like it so I changed it…I said, 'look I'll do one myself'…and it's worked really well, but to get people to start using it is another thing. Even though they will help me to do it I had to just keep bullying people into filling out these things, and just to go along with maybe what is a better idea for them, do you know what I mean? (Staff Nurse, D, Surgery, Site 2)

The experience–information technology interface

Interviews with nurses revealed that practitioners were very often not confident with their information technology (IT) skills and that experiences of using these resources were often negative – or at least not wholly successful:

Nurse: I did a basic research thing. I think the hardest thing is actually getting them up on the…where I always have a problem is getting them up on the computer when I do my literature research. I either get nothing, or I get hundreds. That's what I always find is the biggest problem…and I don't know whether I'm doing something wrong, when I do that. I don't know whether I'm just not experienced enough, because when I did this last course a friend even took me up at my local college to go on to the Internet and I never found a thing, and that can't be right, I must have been doing something wrong. I couldn't find anything. (Clinical Nurse Specialist, Surgery, Site 2)

It was little wonder then that modern computer technology was rejected as a useful input for clinical decision-making (statements 23 and 24).

Rejecting commercial presentation

The observation that product company advice lines were not seen as useful sources (statement 12) could be explained by the fact that whilst product company representatives were involved as resources in changing practice, they were often limited to two areas – pressure area care and wound care. Moreover, many nurses saw the commercial sector as inherently biased in the presentation of research messages. For some, commercial involvement in research material was a negative criterion in the informal appraisal processes they employed.

Nurse: What do I think of reps?! Well they just want to sell their product, don't they. And they always have the right research that supports their product, which well I don't like that, really. I think its better to read research, or depend on research that isn't reliant upon the products. (Staff Nurse, F, Medicine, Site 1)

Again, the lack of clinical credibility associated with mainstream media meant that they were not seen as useful. The most often cited reason for the lack of utility, aside from credibility, was the lack of depth associated with most articles.

Associated characteristics

Being a graduate was negatively associated with this perspective (regression coefficient –17·33, P 0·021), suggesting that nurses educated to degree level were less likely to favour the notion of experience over all other sources knowledge. We found that nurses with degrees were also the most likely to be

confident with handling research materials and better able to make use of the material (Thompson *et al*. 2001).

It should be remembered that this view is a *relative* weighting of experience. The experienced clinician was perceived as the most valuable resource in many situations. Here one graduate nurse with a negative association with the perspective (factor loading –0·7) reveals that the clinical specialist is still the information source of choice:

Nurse: Where normal protocols are not working. We have quite strict diabetic protocols for people who have had surgery and they're not eating, management of them, and if their blood sugars are not being managed on that regime, they might need a review. If we just pick up they've got raised blood sugar when they come in and may need the whole caboodle they need the counselling and everything we get a diabetic nurse specialist in for that because I wouldn't know where to start with counselling somebody about being diagnosed diabetic. (Staff Nurse, E, Surgery, Site 3)

Perspective 3: centrally supported experience-based messages for practice

This perspective accounted for 11% of the variance associated with the Q sorts and again viewed experience and human sources as the primary sources of useful clinical information (statements 7 and 11). What makes the perspective different is the weighting attached to the organizational practice development and clinical effectiveness functions (statements 36, 19, 17).

Support for the processes of knowledge development

The usefulness of these central resources lay mainly in their role as a supportive element in the development of research-based decision support technologies. This idea of offering support in the generation of new knowledge was the raison d'être of one Research and Development (R&D) support unit's key workers:

Manager: In a way I suppose it [*research*] has to be rigorous and of a credible standard if it is going to be useful or worthwhile. And certainly [the local university] has got quite a purist approach to research, whereas Nurse X and I are a bit more pragmatic, and felt that people at the grass roots level could get involved in small scale research things but that might not be of suitable quality for example, to be published in a peer refereed journal. But this would at least give them a good awareness of research and also possibly motivate them to continue as well. So I was aware there is this tension really about how – the best way of encouraging people to get involved in research. For myself one of the best ways would be to just get their hands on it really, and I suppose that is something that is quite handy, because now the R&D unit has come up we can resource that as well and give the support necessary for it to be a credible piece of research. (Research and Development Support Manager, Site 3)

Perceptions of central support (in the form of practice development and audit functions) revealed in interviews were variable. Those elements of the roles perceived as most useful focused on practical or clinical 'skills', for example, practice development nurse support for venepuncture, recording electrocardiograms (ECGs), advanced life support or cardiac rehabilitation.

Skills development, however, was not always linked to the common decision areas of nurses, and consequently they sometimes found themselves with a redundant skills base:

Nurse: …I sometimes wonder whether a lot of what they (practice development) are doing, particularly in putting nurses forward for extra clinical skills, I wonder if that's the right thing to do in large numbers…one of the problems of having huge numbers of people doing courses to say they've got these clinical skills. And people, for various reasons, their own insecurity, or purely circumstances, they don't utilize these skills and become de-skilled and it's been a complete waste of time. (Clinical Nurse Specialist, Medicine, Site 3)

For some nurses the involvement of practice development teams and scarce resources such as clinical audit assistants were indicative of management or organizational support, and for this reason were seen as useful and responsible for sending strong motivational messages to clinicians.

The value of second-hand experience

This perspective was also characterized by the perceived usefulness of clinical case studies as a source of information:

Int.: What kinds of articles do you like, then, to read? What is it about them that you like?

Nurse: I think it's the ones that aren't too technical. They give you the information; often I think a lot of them do them as case studies. You read a case study and what was done afterwards. I think you can relate it more to your patients yourself, then. Obviously some subjects you can't do that with. I don't know how to describe it, really. It's got to be easy reading. (Staff Nurse, F Grade, Medicine, Site 2)

As well as the observation that case studies often made for easier reading, many nurses had been asked to construct case studies as part of the requirements of continuing professional development (CPD) courses or as academic preparation for registration and so it was not surprising that they expressed a preference for the format. In addition the theme of 'reflection on action' was a strong element in the accounts of some of the nurses defining this stance. Some described decisions or areas of practice almost as mini case studies and used them as such

in teaching and instruction of students and those 'less experienced' than themselves.

Associated characteristics

Being a CNS (adjusted regression coefficient –17·68, $P = 0{\cdot}016$) and working on a CCU (adjusted regression coefficient –7·9, $P = 0{\cdot}016$) were negatively associated with this perspective. It is difficult to know whether these nurses fail to see practice development teams or other CNSs as useful, or are less likely to reject sources such as research studies in the *British Medical Journal*, the internet or journal clubs.

Clinical nurse specialists and staff interviewed and observed in CCUs all made reference to medical research studies and had extensive collections of papers from medical journals. Similarly, two of the three CCUs involved (2 and 3) had appraised papers in journal clubs, although these clubs' chances of survival were haphazard. In addition at least some of site 1's CCU staff had clearly appraised research-based technologies (such as the protocol for diabetes management produced as a result of staff reading clinical trial findings).

Both CNSs and CCUs also appeared 'self contained' in their information-seeking behaviours:

Int.: Do you get any other outside influence for updating, like practice development nurse, or your H Grade you mentioned?

Nurse: We tend not to, really, from anybody else. We haven't got a practice development nurse, and the H Grade is just for the two wards. They don't have any sort of contact with us in the unit, other than passing on of ward information, really. (Staff Nurse, E, CCU, Site 1)

Coronary care unit nurses also tended to have attended the same courses, such as the ENB (English National Board for Nursing, Midwifery and Health Visiting) coronary care course. Much of the output from students on this course found its way back into the units and was used by others, although not in the context of real time decision-making. The role of practice development teams and Trust audit teams appeared less prominent in CCUs than in the general medical and surgical units sampled.

Perspective 4: blending research, technology and experience for usefulness

This perspective accounted for 13% of the variance in the Q sorts and again the CNSs were the most useful information source. What defines this perspective is the positive valuation afforded to explicitly research-based sources such as systematic summaries of research studies, and the fact that these are seen as more useful than single research studies. This distinction suggests an ability to recognize the virtues of systematic reviews as reported in the literature (Mulrow 1994). For some nurses the benefits of having someone else appraise the research for you were clear, namely, an implicit increase in the trustworthiness of the end product:

Int.: So, do you trust all research that's published?

Nurse: No, but then the only research that changes our practice isn't any piece of research, it's a group collection of research that's been proven that it will help to change our practice so it's already gone through that process of being proven.

Int.: Before the consultants bring it to you, you mean?

Nurse: Yes, before it's even suggested we change our practice.

Int.: Who's filtered it?

Nurse: If it's medical initially it probably would be the consultants and then it would be discussed with [ward manager] and then it's discussed with us a group and then it's brought in, so there's lots of sort of…what word am I looking for…there's lots of people that have looked, and looked at the research that know what they're talking about and have decided whether it's good or bad before it gets to us. (Staff Nurse, E, CCU, Site 3)

Library resources generally were valued by the nurses defining this perspective, but interviews revealed that on the whole, library skills were at a fairly rudimentary level. Nurses occasionally relied on serendipity as a route to finding the 'one good paper' as opposed to harnessing the power of information technology:

Int.: Have you ever used COCHRANE?

Nurse: No. Haven't used MEDLINE either.

Int.: Right, is there any other source of information within the library that you've looked at? Apart from the databases.

Nurse: Just the journals and things that are there, but nothing sort of computer based…when I've been in the library here it's all been quite specific around a certain area relating to the courses that I've done, and it's been quite easy to get relevant, interesting references just off, for example, a decent paper, finding it that way. (Staff Nurse, E, Medicine, Site 3)

The CNS defining this perspective revealed some confidence in accessing information electronically:

Int.: Right, so have you used any of the databases in the library, to look up any information?

Nurse: Oh, you mean CINAHL? Well, I've used CINAHL and I've been on MEDLINE as well. And I've used the CINAHL books as well as the CD-ROM.

Int.: Right, have you dipped into COCHRANE at all?

Nurse: Well, COCHRANE I've found, I've tried to access that through university as well and I found that a little bit difficult 'cos I seemed to sort of go round in a loop and not really find what I wanted.

Int.: Right, what was it you were looking for?

Nurse: I can't remember at the time, I can't remember what I was doing. It must have been to do with assessing really, when I was doing the teaching and assessing course. At the time I just couldn't find what I wanted, but I mean COCHRANE's really more to do with clinical care, isn't it, rather than academic things. I think, that's the impression I get, anyway. (Clinical Nurse Specialist, Medicine, Site 3)

Observational and interview data showed that the library at site 3 had the facility to monitor the use by various clinical groups of the resources available and CNSs made no more use of the facilities than any other group. There *were* some nurses using electronic technologies and the library. However, their use of library or electronic resources was almost exclusively linked to academic courses or CPD, and/or the development of decision aids such as patient management protocols or ward standards. Where people sought information for *real time* clinic problems on wards, they tended to fall back on accessible human sources.

The nurses defining this perspective also tended to be those who reported a degree of competence with critical appraisal. However, appraisal criteria were varied and not always linked to isolating the validity, clinical significance and applicability of studies. Whilst not linked to *formal* appraisal methods, most nurses appeared to have an *intuitive* idea of bias, representativeness and adequacy in design:

Nurse: The cross section, isn't it, you know what I mean, the population, isn't it, so you're looking to make sure that you know, has the sample of people that have been chosen, is it a fair representation of the population, depending on what you're dealing with, wasn't it. Em…, so you're looking…you're basically looking at who they've used, what method they've used, what items, what er… you know what products, if it's a product, what product they've used, and has it been fairly done, and has there been an ulterior…ah, I remember that…has there maybe been an ulterior motive for doing the research, have they been sponsored by a particular company. Do they work for a particular health authority that are promoting, or saying…look we're the best in em…that type of thing, so you were seeing if it's a fair…fair research. (Staff Nurse, E, Surgery, Site 2)

Associated characteristics

The more clinically experienced a nurse the less likely they were to be aligned with this perspective (regression coefficient $-0{\cdot}699$, $P = 0{\cdot}04$). One explanation might be that those nurses with the most clinical experience in a specialty were the least likely to be confident in handling research-based products (Thompson *et al*. 2001).

Discussion

Whilst four thematic perspectives emerged from the data (each with a slightly different balance of experiential and explicitly research-based sources), it was CNSs and other human information sources that were overwhelmingly classed as most useful. Only in the cases of perspectives 1 (with its emphasis on guiding or prescriptive information) and 2 (with its emphasis on the role of systematic research summaries and electronic and library resources) were there any discernible shifts from this stance. This finding is perhaps unsurprising, as previous research on the sources of influence on nurses' practice (albeit community nurses) reveals that experiential rather than research-based knowledge is strongly valued (Luker & Kenrick 1995, Luker *et al*. 1998).

Because advice or guidance is derived from a human source, the reader should not assume that such advice has no basis in research knowledge. On the contrary, we found that CNSs often stockpiled research-based materials, had extensive clinical, research and commercial networks to draw upon, and personal development strategies which included conferences and seminars. Moreover, they had responsibility for teaching and the dissemination of research through the link nurse structure, and a degree of 'intuitive' appraisal skills, suggesting some ability to separate good research from bad.

However, these characteristics were variable and there was often no way of auditing the information provided. There were also instances where practitioners had extensive knowledge themselves (and therefore a reduced level of dependence on expertise) and where the CNS role was questioned. This represents something of a dilemma for those who would like to see nurses appraising messages for themselves, particularly as CNSs had the enviable ability to be able to draw on the considerable amounts of trust placed in their knowledge base – trust born of clinical as opposed to research skills.

This pattern represents something of a contradiction: nurses appeared to reject (relative to other sources) secondary research in the form of systematic reviews, and yet welcomed the trusted, focused and translated advice of CNSs. A number of tentative reasons for this picture can be advanced, although all require further exploration. First, CNSs (and other experience-rich sources) possess large amounts of professional–cultural 'currency' in the form of experiential knowledge (Luker & Kenrick 1995, Royle *et al*. 2000).

Secondly, specialists and influential human sources fulfil the criteria for a successful information system *per se*: they are relatively (when compared with computerized information) easily accessible, they can adapt messages to counter individual, organizational and environmental barriers to research use (Dobbins *et al*. 1998). Finally, they are able to harness multiple approaches to changing practice, including one-to-one educational approaches, influencing the clinical audit agenda, clinical teaching, mentorship or role modelling. These multiple approaches are more successful than single approaches for bringing research knowledge into clinical practice (Bero *et al*. 1998). Of course, good systematic reviews have at least some of these characteristics as well (i.e. they can be trusted, focused on a clear clinical question, and offer plain language recommendations for practice and research). What specialists and other trusted sources offer is a crucial translation function for clinicians.

In terms of what was *not* useful there were also some clear messages. No nurses viewed text books as a useful resource and equally the role of local information files was not hugely supported either. This was important as both of these resources were very much in evidence on the wards. Moreover, in the case of local information files, a considerable amount of effort seemed to be expended in developing them – often as part of the link nurse role. Worryingly, the internet, on-line databases and other library based resources, such as the COCHRANE Library, were not viewed as having much utility for practice. What was clear, however, was that library skills and support to enable nurses to make the most of the (extensive) resources available in each of the sites were seen as poorly developed. As Royle *et al*. (2000) point out, physical access to research information is a significant barrier to research. Our research also suggests that a powerful force obstructing the use of research findings in clinical decision-making is the difficulty nurses have with reading and interpreting quantitative research findings, and statistics in particular (Thompson *et al*. 2001). A common theme in other studies looking at research utilization (Funk *et al*. 1995, Parahoo 2000, Retsas 2000). Clearly, nurse educators need to devise innovative and effective ways of developing competencies in practitioners with regard to statistical information. Unless nurses are provided with the necessary skills and knowledge to locate, appraise and implement research knowledge in the context of clinical decisions then intellectual accessibility will continue to be as problematic as physical inaccessibility.

Conclusion

This paper started with the seemingly obvious statement from Royle *et al*. (2000) that the success of any system must be judged by the amount of use it gets. From the interviews, observation and Q data used in our study it was clear that sources which *combine* clinical expertise, experience and perceived research-based knowledge attract the most use. Currently this type of system appears best represented by the CNS or nurse consultant role.

The overall conclusion, then, must be that it is not research knowledge *per se* that carries little weight in the clinical decisions of nurses. Rather, it is the medium through which it is delivered. Text-based and electronic resources are not yet much use for nurses engaged in making decisions, in real time, in real practice. Our study only examined nurses' use of research information in the acute care sector, with its relatively well-developed information technology and development infrastructures. We are currently engaged in examining the use of research information by primary care nurses – a population who may (in comparison) be more isolated from the sources of information that proved so influential in this study.

Based on our findings, it would appear that the challenge for policy makers, practice developers, educationalists and researchers is either to give nurses the skills, resources and motivation to make information technologies more useful or to explore alternative ways of presenting quality research information – possibly by harnessing the power of those who embody the clinical specialist or nurse consultant role.

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